

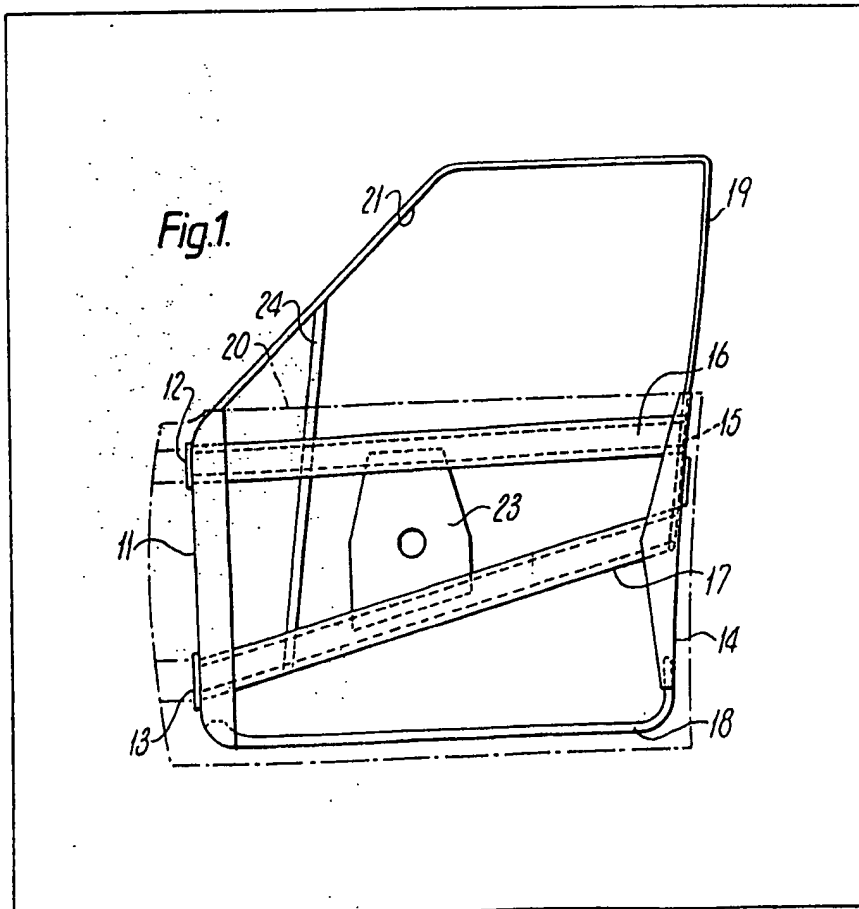
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(71) Applicants  
**BL Technology Limited**  
**(Great Britain),**  
**35—38 Portman Square,**  
**London W1H 0HQ**  
(72) Inventors  
**Gordon Dennis Bashford,**  
**Charles Spencer King**  
(74) Agents  
**British Leyland Motor**  
**Corporation Ltd.,**  
**(O. C. Rock), Patent and**  
**Trade Mark Department,**  
**Cowley Body Plant,**  
**Cowley, Oxford**

(54) **Vehicle door**

(57) The door has a pair of hinge mountings 12, 13 on one edge and a latch mounting 15 on the opposite edge. The latch mounting is joined to each of the hinge mountings by a separate girder 16, 17. A vehicle

equipped with such a door has corresponding structural members for the hinge and latch mountings in the body of the vehicle so that the vehicle body is able to transmit compressive loads arising from front or rear collisions across the closed doors by way of the girders.



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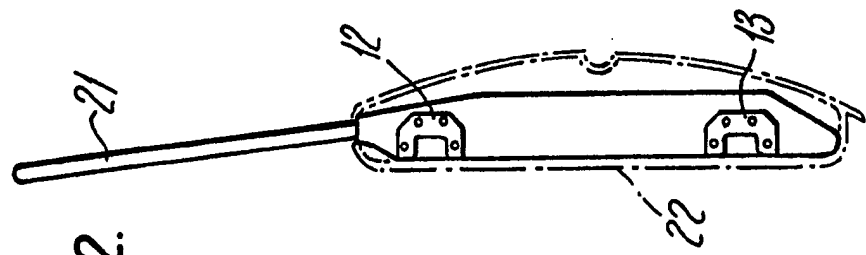


Fig. 2.

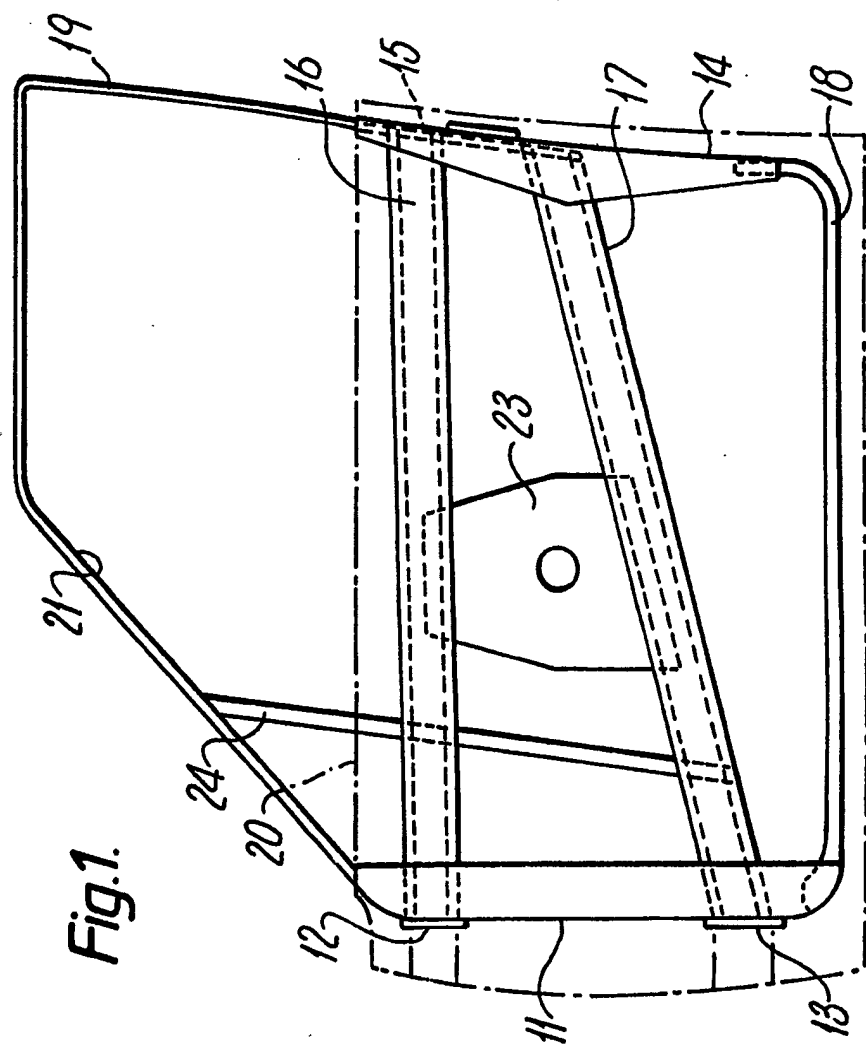


Fig. 1.

## SPECIFICATION

### A vehicle door

This invention relates to a door for a vehicle.

A vehicle door usually consists of inner and  
 5 outer pressings joined together by clinched  
 flanges making use of adhesives or welding. In  
 some cases the whole door may consist of  
 pressings which include an upper frame work for a  
 glazing arrangement. In other cases smaller  
 10 pressings are used for the bottom part of the door  
 with a separate rolled section framework for the  
 glazing arrangement which is usually welded or  
 bolted to the door pressing. This type of door  
 needs reinforcement to sustain compressive loads  
 15 due to front or rear impacts on the vehicle and in  
 some countries protection from lateral impact is  
 required by law. Current legislation also calls for  
 protection against a door coming open during  
 impact or other adverse conditions so that the  
 20 latching and hinging arrangements of the door  
 have to provide an anti-burst requirement.

According to a first aspect of the present  
 invention there is provided a door for a vehicle  
 comprising a first peripheral region on which are  
 25 disposed a spaced pair of hinge mountings for  
 pivotably connecting the door to a vehicle body; a  
 second peripheral region, opposite the first region,  
 on which is disposed a mounting for a latch for the  
 door; a first girder member extending between  
 30 one of the hinge mountings and the latch  
 mounting and rigidly attached to both mountings;  
 and a second girder member extending between  
 the other of the pair of hinge mountings and the  
 latch mounting and rigidly attached to both  
 35 mountings.

According to a second preferred form of the  
 first aspect of the present invention the girder  
 members have mounted on them at least part of a  
 door mechanism such as a latch, window guide or  
 40 window winder.

According to a third preferred form of the first  
 aspect of the present invention a door for a vehicle  
 according to any of the previous forms includes  
 external cladding in the form of an outer skin panel  
 45 and an inner cladding in the form of a trim panel.

According to a fourth preferred form of the first  
 aspect of the present invention a door according  
 to the third preferred form is characterised in that  
 both the skin panel and the cladding panel are  
 50 unstressed.

According to a second aspect of the present  
 invention there is provided a vehicle having at  
 least one door according to any form of the first  
 aspect which door is coupled to the body by way  
 55 of a hinge linking each hinge mounting on the  
 door to a hinge mounting on the vehicle body; and  
 there is provided a latch linking the latch mounting  
 on the door to a latch mounting on the vehicle  
 body, the hinge and latch mountings of the vehicle  
 60 body being coupled to structural members of the  
 vehicle body adapted to resist compressive loads  
 arising from front and/or rear impacts on the  
 vehicle.

According to a second preferred form of the  
 65 second aspect of the present invention, there is  
 provided a vehicle according to the first preferred  
 form wherein the door girder members, at least  
 with the door closed, co-operate with structural  
 members of the body to resist lateral impacts on  
 70 the door.

An embodiment of the invention will now be  
 described with reference to the accompanying  
 drawings in which Figure 1 is an outside view of  
 the vehicle door; and Figure 2 is a view of the door  
 75 in Figure 1 in the direction of the arrow II.

The door shown in the Figures has a front edge  
 11 on which are mounted a spaced pair of hinge  
 mountings 12, 13. On the opposite side of the  
 door the second peripheral region 14 has mounted  
 80 on it a latch plate 15. The hinge mounting 12 and  
 the top of the latch mounting 15 are rigidly  
 coupled by a U-section girder 16. The lower hinge  
 mounting 13 is likewise coupled to the latch plate  
 15 by a second U-section girder 17. The front and  
 85 rear peripheral regions of the door 11, 14 are  
 joined at their lower ends by a lower door frame  
 member 18 and at their upper end by a window  
 guide channel frame 19.

The form of the outer cladding for the door is  
 90 shown by a broken outline 20. The inner side of  
 the door frame below the window aperture 21 is  
 masked by a trim panel 22 shown in Figure 2. The  
 door latch and window winders are not shown but  
 are mounted on plate 23 extending between the  
 95 girders 16, 17. The girders also serve to carry a  
 window guide channel 24 which serve to locate  
 the leading edge of the window panel (not shown).

The load carrying structure of the door is made  
 up of what could be described as the triangulated  
 100 connection between the girders 16 and 17 the  
 latch plate 15 and the hinge mountings 12, 13.  
 This triangulated arrangement carries the upper  
 door framework made up of the channels 19 and  
 21 for the vertical operation of the window. The  
 105 triangulated structure allows for a ready change to  
 the cladding provided for the exterior and the  
 interior finish of the door since these have very  
 little or no stressing in use.

In a vehicle making use of the door described in  
 110 connection with Figures 1 and 2 the  
 complementary hinge mountings to the  
 mountings 12 and 13 on the door are  
 incorporated in further girder systems so that front  
 or rear impacts on the vehicle result in loads which  
 115 are fed into the girder system of which girders 16  
 and 17 form a part. In this way the resultant  
 compressive loads are fed into the whole vehicle  
 structure. Among other advantages this will act to  
 reduce the distortion of the door openings which  
 120 can occur in such impacts.

The girders 16 and 17 also serve to resist side  
 impacts on the door and hinge mountings 12 and  
 13 and latch plate 15 can be angled so that lateral  
 impacts on the door are fed by the girders 16 and  
 125 17 into complimentary structural members in the  
 vehicle body. In this way both the hinges and the  
 latch would not be required to sustain the entire

loading arising from the lateral impact.

#### CLAIMS

1. A door for a vehicle comprising a first peripheral region on which are disposed a spaced pair of hinge mountings for pivotably connecting the door to a vehicle body; a second peripheral region, opposite the first region, on which is disposed a mounting for a latch for the door; a first girder member extending between one of the hinge mountings and the latch mounting and rigidly attached to both mountings; and a second girder member extending between the other of the pair of hinge mountings and the latch mounting and rigidly attached to both mountings.

2. A door as claimed in Claim 1 wherein the girder members have mounted on them at least part of a door mechanism such as a latch, window guide or window winder.

3. A door for a vehicle as claimed in Claim 1 or Claim 2 including external cladding in the form of an outer skin panel and an inner cladding in the

form of a trim panel.

4. A door as claimed in Claim 3 characterised in that both the skin panel and the cladding panel are unstressed.

5. A door for a vehicle as hereinbefore described with reference to, and as illustrated in the accompanying drawing.

6. A vehicle having at least one door according to any preceding claim which door is coupled to the body by way of a hinge linking each hinge mounting on the door to a hinge mounting on the vehicle body; and there is provided a latch linking the latch mounting on the door to a latch mounting on the vehicle body, the hinge and latch mountings of the vehicle body being coupled to structural members of the vehicle body adapted to resist compressive loads arising from front and/or rear impacts on the vehicle.

7. A vehicle as claimed in Claim 5 wherein the door girder members, at least with the door closed, co-operate with structural members in the body to resist lateral impacts on the door.